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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/790,828	03/03/2004	Masakiyo Matsumura	249687US2	1522
22850	7590	07/11/2008		
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314				
EXAMINER				
SONG, MATTHEW J				
ART UNIT		PAPER NUMBER		
1792				
NOTIFICATION DATE		DELIVERY MODE		
07/11/2008		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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### Office Action Summary

**Application No.**

10/790,828

**Applicant(s)**

MATSUMURA ET AL.

**Examiner**

MATTHEW J. SONG

**Art Unit**

1792

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 April 2008.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 3, 5, 11, 18 and 20-41 is/are pending in the application.  
4a) Of the above claim(s) 20-38 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 3, 5, 11, 18 and 39-41 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO/SF-08)  
Paper No(s)/Mail Date \_\_\_\_\_

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 3, 5, 11, 18, 39, 40, and 41 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 3 recites, “a light intensity distribution to be increased substantially straight toward a periphery from a central area” in lines 12-13. There is no support in the original disclosure for “substantially straight.” The same arguments apply to the remaining claims which incorporate the same limitation.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 3, 5, 11, 18, 39, 40, and 41 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 3 recites, “a light intensity distribution to be increased substantially straight toward a periphery from a central area” in lines 12-13. It is unclear what is

"substantially straight" because "substantially straight" is not defined in the specification and it is unclear what amount of curvature is permissible while still being "substantially straight." The same arguments apply to the remaining claims which incorporate the same limitation.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 3, 5, 11, 18, 39, 40, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi (US 5,710,620) in view of Kunii et al (US 6,388,386).

Taniguchi discloses an apparatus comprising a phase shifted reticle where the angle of diffracted light generated from a pattern of the reticle varies with the line width and pitch of the pattern (col 10, ln 15-40 and col 12, ln 45-60), this clearly suggests a phase modulation element.

Taniguchi also teaches an illumination system **1** used to generate light beams which enter the phase modulation element (col 5, ln 1-15 and col 10, ln 15-30). Taniguchi also teaches an image formation optical system **7A, 8** provided on an outgoing radiation side of the phase modulation element **R** (col 5, ln 1-67 and Fig 1). Taniguchi also discloses a stage **WS** for holding a wafer **W** (col 6, ln 45-65 and Fig 1). Taniguchi also teaches the phase shift reticle (phase modulation element) has at least two phase modulation elements and is configured to transmit light (Fig 3A). Taniguchi also teaches a plane which is orthogonal to a light incidence direction being defined by a first and second direction (Fig 1 shows the light vertical and the reticle horizontal and the reticle extends in the vertical and horizontal directions in Fig 11A). Taniguchi also teaches strip like areas which extend parallel to the second direction and to which first and second phase values are given. (Fig 11A and 12A show strip like areas and discloses a plurality of normal patterns with different preciseness (line width and pitch) (col 12, ln 40-65), thus produces different phase values).

Regarding the limitation, "each of the phase modulation units is optically smaller than a radius of a point spread distribution range of the image formation optical system when converted to an image formation surface to the image formation optical system and the radius of the point spread distribution range of the image formation optical system is defined to satisfy the follow equation:" and "the phase modulation element has a plurality of cells each of which is optically smaller than the radius of the point spread distribution range of the image formation optical system converted to the image formation surface" The limitation is an intended use limitation based on the desired radius of a point spread distribution from the optical system. A recitation of the intended use of the claimed invention must result in a structural difference between the

claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. Taniguchi discloses all of the apparatus limitation, as discussed previously, and the apparatus is capable of changing the illumination conditions, ring zone illumination and grading illumination by the arrangement of the parts, thus would be capable of the producing a point spread distribution radius which is optically large than the phase modulation element. The same argument applies to claims 3, 5, 11 and 39 directed to features of the phase modulation element compared to the radius of a point spread distribution.

Taniguchi does not teach at least two modulation units to vary a light intensity distribution to be increased substantially straight toward a periphery from a central area.

In a method of manufacturing a semiconductor, note entire reference, Kunii et al teaches a phase shifter to irradiate a film with light beams having a intensity including a concave pattern and an inverse pattern (Abstract, col 14, ln 1-67 and Fig 10-11). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Taniguchi by using the phase shifter taught by Kunii et al to produce a desirable light intensity pattern for the manufacture of semiconductors.

Referring to the limitation "to be increased substantially straight toward a periphery from a central area," Kunii et al teaches a pattern which increasing from a central region to a periphery with little curvature thus is interpreted by the Examiner to increase in a "substantially straight" manner (Fig 10). Substantially straight is indefinite for the reasons discussed above, thus the teaching of Kunii et al is interpreted by the Examiner to meet the claimed limitation.

Referring to claim 18, the combination of Taniguchi and Kunii et al teaches concave and an inverse peak pattern. ('386 Fig 10).

Referring to claim 39, claim 39 has all of the same limitations as claim 3, which was discussed previously. Claim 39 further requires "in at least one direction" which is met because the apparatus is capable of producing a radius of a point spread distraction range of the image formation optical system that is larger than the phase modulation element is at least one direction.

Referring to claim 40, the combination of Taniguchi and Kunii et al teaches a concave pattern increased substantially straight toward a periphery from a central area ('386 Fig 10).

#### ***Response to Arguments***

7. Applicant's arguments with respect to claims 3, 5, 11, 18, 39, 40, and 41 have been considered but are moot in view of the new ground(s) of rejection.

#### ***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Shiraishi (US 5,715,089) teaches a pattern of stripe and pixels (Fig 7A and 7C).

Lin et al (US 5,539,568) teaches the size of the beam of light modulated by each pixel or element of the phase modulator should be no larger than the minimum feature of the mask (col 7, ln 40-65).

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. SONG whose telephone number is (571)272-1468. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Kornakov can be reached on 571-272-1303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Matthew J Song  
Examiner  
Art Unit 1792

MJS  
July 6, 2008  
/Michael Kornakov/  
Supervisory Patent Examiner, Art Unit 1792